CLAIMS

1.   A data relay device, the device having

        receiving means for receiving payload data from a data source,

5   a buffer for storing payload data for subsequent transmission,

        means for receiving status data from similar devices,

        status data generation means for generating status data, the status data being

derived from the quantity of data in the buffer store and the status data received from

other devices, and comprising data relating to

10   the separation of the device from other devices,

                the quantity of data in the buffer store

        means for determining a scalar status value determined by the quantity of data

stored in the buffer and its separation from nearby sensors,

        status transmitter means for transmitting the status value to other devices

15   selection means for identifying, from the status data received from other devices,

a receiving device having a status value which varies from its own status value in a

manner indicative that payload data may be forwarded to it, and

        payload transmission means for transmitting the payload data to the identified

receiving device.

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2.   A data relay device according to claim 1, comprising means for receiving payload

data transmitted by other similar devices.

3.   A data relay device according to claim 1 or claim 2, further comprising a data

25 source

4.   A data relay device according to any preceding claim, wherein the selection

means is arranged to only identify a suitable receiving device if the scalar status value

meets one or more threshold criteria.

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5.   A device according to claim 4, wherein a threshold criterion is that the remaining

battery power is at least sufficient to transmit all the data currently in the buffer.

6.   A device according to claim 4 or 5, having means for selecting a threshold

35 criterion as a function of elapsed time from a predetermined start point.

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7.   A data relay device according to any preceding claim, further comprising condition-monitoring means for monitoring the expected lifetime of the device, and adjusting the scalar status value accordingly.

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8.   A device according to any preceding claim, wherein the separation between devices is determined from the power required to make a transmission between them.

9.   A device according to any preceding claim, comprising means for determining the

10 power that would be required to transmit payload data to an identified receiving device, and means for generating a scalar status value related to that power requirement.

10.   A device according to claim 9, wherein the identified receiving device on which the power determination is based is the device selected for transmission on a previous

15 determination.

11.   A device according to claim 9 or 10, wherein the scalar status value h is determined by the value $(N + k) \, C \, / \, B$

where N = number of packets of data currently in the buffer

20   B = battery level

C = power requirement of forwarding to the identified receiving device.

k is a constant

12.   A method of operating a plurality of data relay devices, comprising:

25   collecting data in buffer stores in one or more such devices,

exchanging status data between the devices, the status data comprising data relating to

the separation between the devices,

the quantity of data in their buffer stores

30   each device defining, from the status data, a scalar status value determined by the quantity of data stored in the buffer and its separation from other sensors

transmitting the status value to other devices and receiving the status values of other devices

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identifying, from the status data received from other devices, a receiving device having a status value which varies from its own status value in a manner indicative that payload data may be forwarded to it, and

transmitting the payload data to the identified receiving device.

13.   A method according to claim 12, wherein data is only transmitted from a first device to a second device located in its forwarding direction if the scalar status value derived from the status data meets one or more predetermined threshold criteria.

14.   A method according to claim 13, wherein a threshold criterion is that the remaining battery power is at least sufficient to transmit all the data currently in the buffer.

15.   A method according to claim 12, 13 or 14, wherein the status data includes a measure of the expected lifetime of the device.

16.   A method according to claim 12, 13, 14 or 15 wherein payload data is transmitted, by means of one or more of the wireless relay devices, to a target sink device defined by a predetermined scalar status value.

17.   A method according to claim 12, 13, 14, 15 or 16, wherein the power that would be required to transmit payload data to an identified receiving device is determined, and a scalar status value is generated related to that power requirement.

18.   A method according to claim 17, wherein the identified receiving device on which the power determination is based is the device selected for transmission on a previous determination.

19.   A method according to claim 17 or 18, wherein the scalar status value h is determined by the value $(N + k) C / B$

where N = number of packets of data currently in the buffer

B = battery level

C = power requirement of forwarding to the identified receiving device

k is a constant